Wasik Magdalena. Women's knowledge of toxicoplasmosis infection and basic prevention measures. Journal of Education, Health and Sport. 2019;9(8):716-726. eISSN 2391-8306. DOI http://dx.doi.org/10.5281/zenodo.3407442
http://ojs.ukw.edu.pl/index.php/johs/article/view/7213

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part B item 1223 (26/01/2017).
1223 Journal of Education, Health and Sport eISSN 2391-8306 7

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 05.07.2019. Revised: 25.07.2019. Accepted: 10.08.2019.

Women's knowledge of toxoplasmosis infection and basic prevention measures

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Abstract

Introduction: Toxoplasmosis is a disease caused by Toxoplasma gondii protozoan. Toxoplasmosis is particularly dangerous for the foetus and any infection, regardless of the period of pregnancy, may cause disorders in the extra-fetal life.

The paper assesses the knowledge of women about toxoplasmosis infection, basic definitions and prophylactic measures.

Aim: The aim of the study was to investigate the level of knowledge of women about Toxoplasma gondii infection, as well as the basic preventive actions.

Material and method: The study was conducted in the period from February to June 2016 by means of a diagnostic survey. 63 women aged 20 and over took part in the survey. The tool used in the study was a questionnaire. The most numerous group were the respondents aged 20-29 years and the least aged 40-49 years. The research results were developed in Microsoft Excel and Statistica 13.1.

Results: The analysis of the collected data shows that women with higher and secondary education have the greatest knowledge of both defining and basic preventive measures.

Conclusions: The level of women's knowledge about Toxoplasma gondii infections varies according to the education of the respondents. The knowledge about basic preventive measures that can significantly reduce the serious consequences of Toxoplasma gondii infections for the developing fetus should be disseminated.

Key words: toxoplasmosis, pregnancy, prophylactic measures

Introduction

Toxoplasmosis is widespread among people around the world. It is caused by the protozoan Toxoplasma gondii. It is an intracellular parasite. The life cycle of T. gondii is characterized by several developmental forms. Oocyst or one of them is particularly resistant to all kinds of disinfectants, as well as physical factors. Therefore, this form of development may remain in the environment for several months. The ultimate hosts of Toxoplasma are

mainly domestic cats. Research shows that it can excrete up to one million oocysts per day[1,2].

There is a risk that humans will become infected with Toxoplasma gondii through food or water that is contaminated by oocysts. Another route may be the passage of the vegetative form of the protozoan, i.e. the trophozoids from mother to fetus[3]. This disease is the greatest risk for people with reduced immunity and for pregnant women[4].

There are several causes of toxoplasmosis infection. First of all, it is poor personal hygiene and inadequate preparation of meals. Central America is a geographical region where the prevalence of this disease is high due to the large number of stray cats. The climate in Central America is also conducive to this. It enables the survival of invasive forms in the environment. Toxoplasmosis is less of a problem in cold, dry and hot climates[5].

Congenital toxoplasmosis occurs in 10-25% of newborns if mothers do not receive adequate treatment[6]. The incidence of the disease is very variable and depends on many factors, such as socio-economic conditions. This is facilitated, for example, by the climate, where toxoplasmosis is less frequent in colder zones[7]. Food habits and culture in the region also play an important role. The prevalence of infections in France can be linked to the propensity of the population to eat undercooked or raw meat. The high incidence of this infection in Central America may also be due to a climate that is favourable for the survival of oocysts and a large number of stray cats.[8,9].

World Health Organisation (WHO) estimates that there are more than one million cases of toxoplasmosis in the European region every year, caused by contaminated food[10].

Infection usually occurs via the digestive tract. When protozoa enter the host, sporozoites or bradyzoites are released from oocysts and tissue cysts respectively. They then convert into tachyzoites, which are crescent shaped. They are sensitive to heat and dryness. Then they spread through the body through the blood and lymphatic system and accumulate in organs and tissues. The parasite has the ability to develop in any tissue and organ, but the biggest consequences are caused by the attack of muscle and nervous tissue[11].

Infection can also occur through the vertical transmission of tachyzoites from mother to fetus through the placenta, resulting in congenital toxoplasmosis. Another cause may be a blood transfusion or organ transplantation[12].

People whose immune system is functioning properly are protected. In this situation,

1 Sibley D, Khan A, Ajioka J, Rosenthal B. Genetic diversity of Toxoplasma gondii in animal and humans. Philosophical Transactions of the Royal Society B 2009; 364: 2749-2761.

2 Dubey J. The history of Toxoplasma gondii – the first 100 years. Journal of Eukaryotic Microbiology 2008; 55(6):467-475.

3 Karczewski G, Gołąb E. Problemy diagnostyki toksoplazmozy wrodzonej. Przegląd epidemiologiczny 2011; 65:451-452.

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6 Cianciara J, Juszczyk J. Choroby zakaźne i pasożytnicze tom II. Wyd. Czelej. Lublin 2012; 682-683.

7 Virtual Medical Centre. Toxoplasmosis. Statistics. https://www.myvmc.com/diseases/toxoplasmosis/ - 22.11.18r., 19.:08

8 Centers for Disease Control and Prevention (CDC). DPDx - Laboratory Identification of Parasitic Diseases of Public Health Concern. Toxoplasmosis. Geographic Distribution
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9 Furtado J, Smith J, Belfort R, Gattey G, Winthrop K. Toxoplasmosis: A Global Threat. Journal of Global Infectious Diseases 2011; 3(3):281-284.

10 Toxoplasmosis Fact Sheet http://www.euro.who.int 22.11.18., 20.20

11 Włodarczyk A, Lass A, Witkowski J. Toksoplazmoza – fakty i mity. Forum Medycyny Rodzinnej 2013; 7(3): 165-175.

12 Niezgoda A, Dobrzańska A. Toksoplazmoza wrodzona – rozpoznanie i leczenie. Przewodnik Lekarza 2008; 2: 44-50.

tachyzoites divide more slowly in tissues and take on another form, i.e. bradyzoite. As a result, the invasive phase transforms into a chronic phase. The next stage is the appearance of cysts. They are present in the host body until the end of their lives, but do not cause any changes. When there is a decrease in the immune system, bradyzoites have the ability to re-convert into tachyzoites, which results in the formation of inflammatory foci. The course of toxoplasmosis is therefore dependent on the general health status of the infected person. An infection that has occurred in healthy people usually develops asymptomatically. Sometimes general symptoms similar to those of influenza may appear. These include muscle pain, fever, headache, weakness and lymphadenopathy. The disease in this form disappears spontaneously and, due to its mild course, is often overlooked by the affected person[13].
We distinguish between acquired and congenital toxoplasmosis. In the first one, one of the symptoms may be an enlarged lymph node, e.g. neck, subfebrile state, weakness, headache. The most common symptoms are so weak that the patient does not notice them or treats them as a common cold. Congenital toxoplasmosis is caused by the penetration of infection from a mother who has infected her child during pregnancy. With the duration of pregnancy, the risk of infection of the foetus increases. The most dangerous situation is when the infection occurs in the first trimester of pregnancy. This can lead to serious damage to the fetus or even a miscarriage. In the second trimester, the symptoms are: small head, nervous system damage, hydrocephalus and epilepsy. At least 10% of infected newborns show symptoms such as diarrhoea, jaundice or encephalitis. The symptoms of toxoplasmosis are therefore very different and depend on the time of infection. It can be asymptomatic and can lead to severe damage known as Sabina-Pinkerton's triad, i.e..:

- hydrocephalus

- microheads

- intracerebral calcification

- retinal and vasculitis

All the above mentioned changes are often accompanied by a delay in both physical and mental development[14].

Preventive actions

Prophylactic measures play an important role in the prevention of toxoplasmosis infection. Education on the pathways to the spread of the disease should be started from an early age. Women who are pregnant or planning to have a child are a group that should be given special care, as the most serious consequences of the disease for the developing fetus. Therefore, a woman who is expecting a child and has a cat at home should ask her loved one to do basic cleaning work. If someone can't help her with these tasks, she should be particularly careful, so wear disposable gloves and wash her hands thoroughly with soap and water after work. Of course, you should remember about the basic principles of hygiene not only when you are pregnant. It is important to wash your hands after each contact with sand and earth. During work in the kitchen, you should thoroughly wash knives and any tools that have come into contact with meat. It is forbidden to try raw meat while preparing meals. Another important preventive measure is thorough washing of fruit and vegetables and avoiding drinking unboiled water. During the journey, only bottled water is recommended[15].

13 Włodarczyk A, Lass A, Witkowski J. Toksoplazmoza – fakty i mity. Forum Medycyny Rodzinnej 2013; 7 (3) 4:166.
14 Markowska A, Połczyńska-Kaniak E. Toksoplazmoza a ciąża. Ginekologia po dyplomie 2010; 3: 24-30.
15 Kwiecień K, Zielińska A. Toksoplazmoza wrodzona a działania profilaktyczne pierwszego rzędu. Problemy pielęgniarstwa 2008; 16(3): 310-315.

Toxoplasmosis leads to disorders of the central nervous system, dizziness, myocarditis or hepatitis in immunocompromised people, such as AIDS patients[16].

The aim of the study

The aim of the study was to investigate the level of knowledge of women about Toxoplasma gondii infection, as well as basic preventive actions, taking into account variables such as age, education and the number of children.

Material and method

The study was conducted in the period from February to June 2016 using the diagnostic survey method and covered 63 women aged 20 and over. The tool used in the study was a questionnaire. It contained 26 questions and they were of a closed nature. The basic information concerned age, education, number of children and place of residence. Other questions that were asked to the respondents concerned the knowledge about protozoa, causes and symptoms of infection, as well as prophylactic measures.

The study was carried out on 63 women aged 20 and over. The largest group was constituted by the respondents aged 20-29 years (42.86%), while the smallest group aged 40-49 years (14.29%).

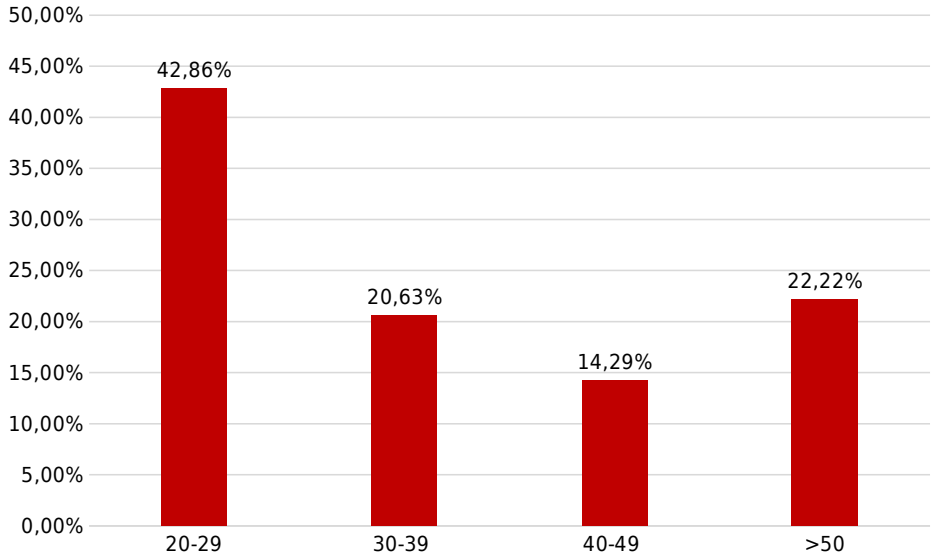

Figure 1. Age of respondents

The respondents were also divided according to their place of residence. Most of the women who took part in the survey came from rural areas (52.38%).

16 Włodarczyk A, Lass A, Witkowski J. Toksoplazmoza – fakty i mity. Forum Medycyny Rodzinnej 2013; 7(3): 166.

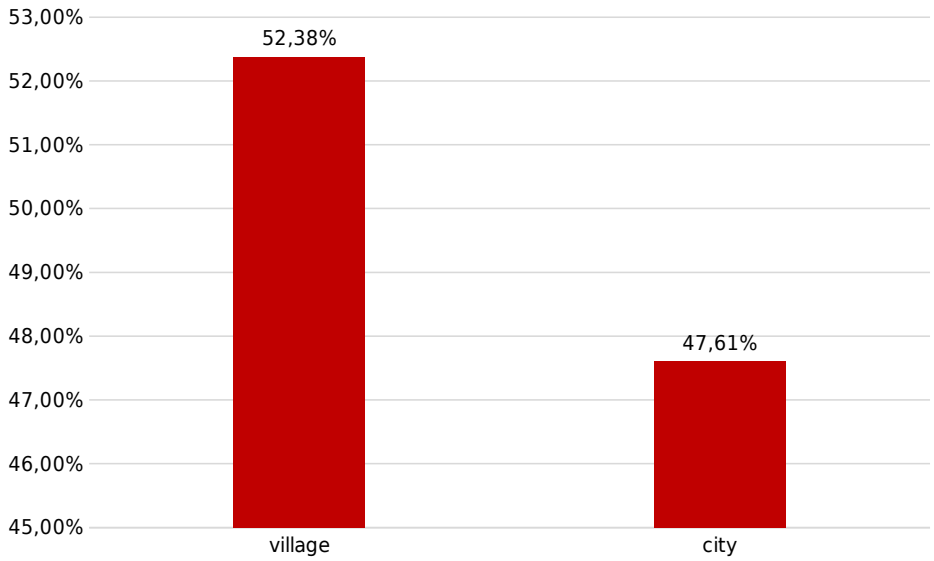

Figure 2. Place of residence of the respondents

Women with secondary education (50.79%) and higher education (41.27%) constituted the largest group. Women with primary education did not participate in the study.

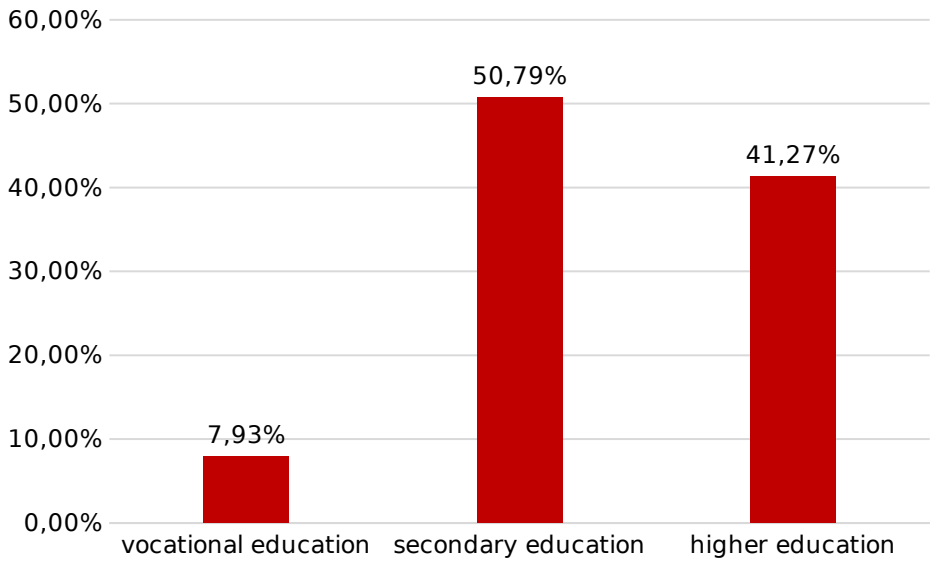

Figure 3. Education of the respondents

The majority of women did not yet have children (44.44%). This is related to the large number of young people who took part in the survey.

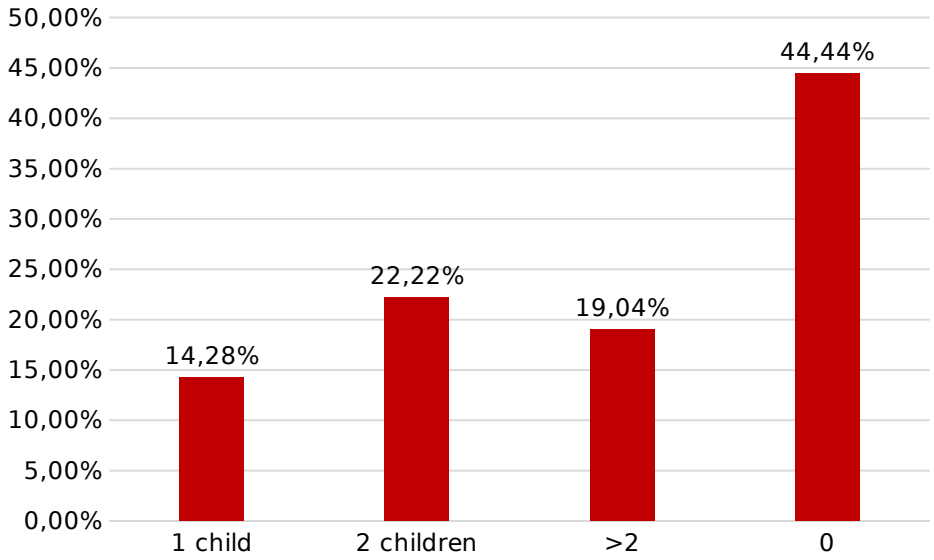

Figure 4. Number of children

Results

The majority of women gave correct answers concerning the type of disease caused by Toxoplasma gondii protozoan. The respondents with higher education (69.23%) and secondary education (71.88) had the greatest knowledge. Among the respondents who did not know the answer to this question, they had vocational education (80%).

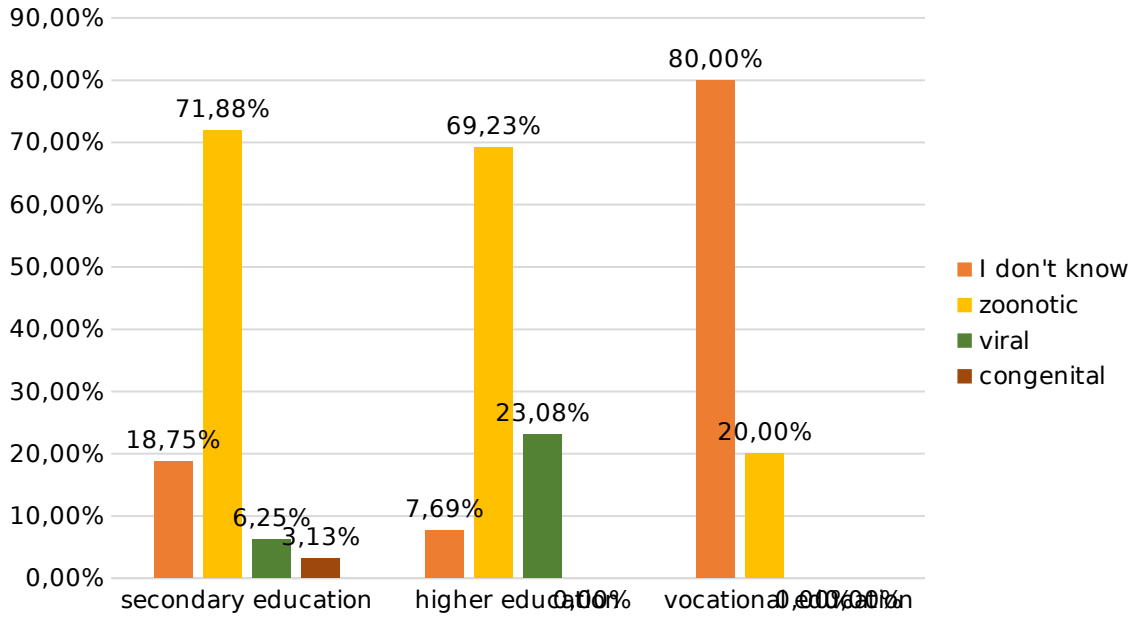

Figure 5. The type of disease that is caused by Toxoplasma gondii according to the respondents

More than half of all women, because 65.08% did not know the correct answer about the risk of infection with toxoplasmosis during pregnancy. Only 19.05% of the respondents had little knowledge about this subject. The rest of the respondents believed that the highest risk of infection occurs in the third trimester of pregnancy.

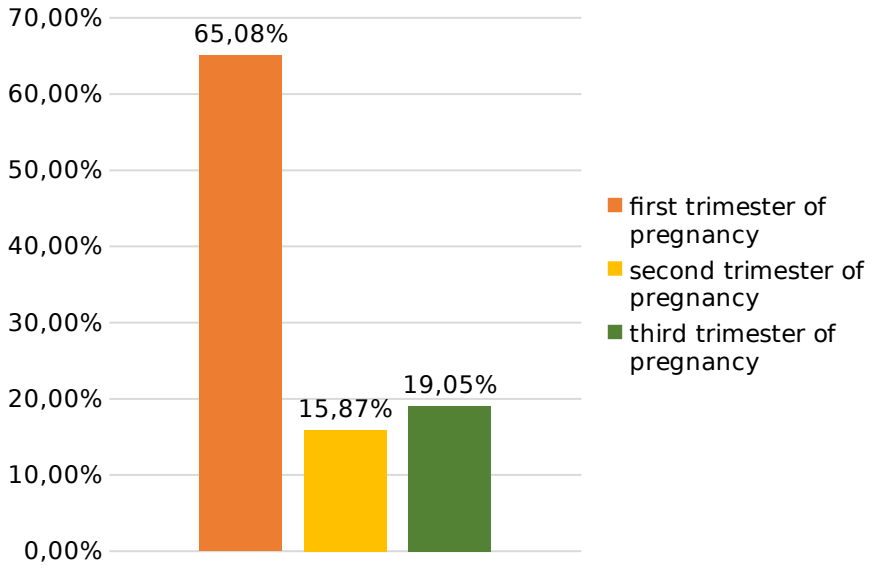

Figure 6. The risk of infection according to the respondents

The study also examined the knowledge of women about tests that are performed during pregnancy to detect toxoplasmosis. The analysis of the data shows that the majority of women have knowledge about this subject and this is not dependent on the number of children they have, as p = 0.44. The results of the study show that the number of children who are pregnant with toxoplasmosis is not dependent on the number of children.

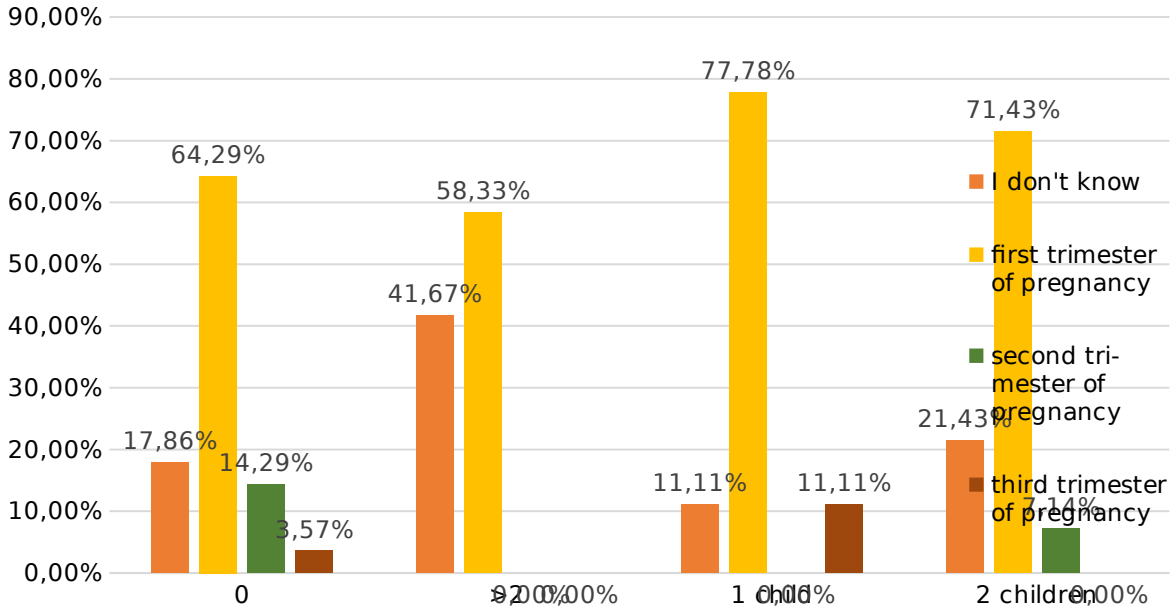

Figure 7. Knowledge about tests performed for toxoplasmosis during pregnancy in relation to the number of children

The questions asked to the respondents also concerned the actions that may lead to an increase in the risk of infection, which is associated with the knowledge of the principles of prevention. Most women believed that the cause of the disease may be the consumption of water and food, which is contaminated with cat faeces (85.71%) and undercooked or raw

meat (55.56%). Erroneous answers indicating that infection can occur by drinking from the same mug as the infected person accounted for the lowest percentage (25.40%).

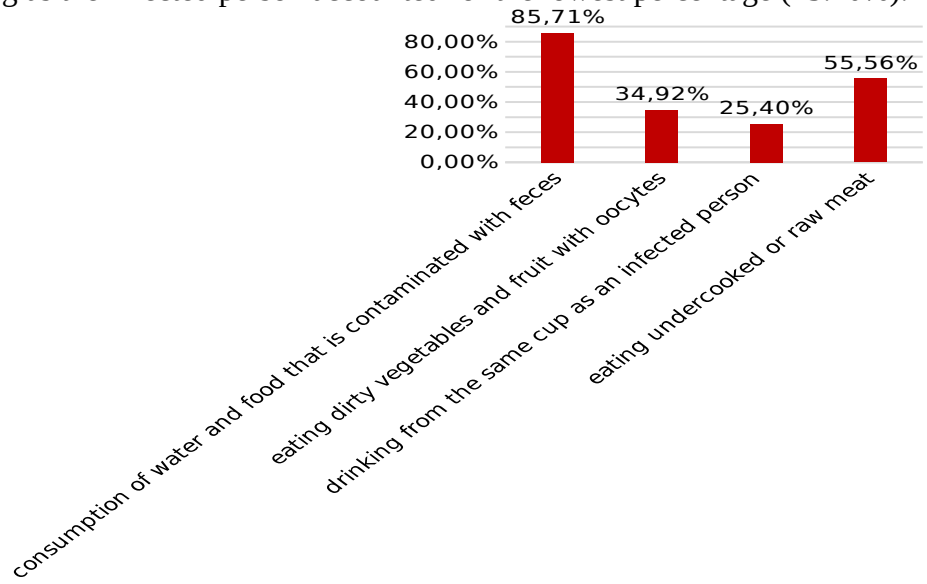

Figure 8. Route of toxoplasmosis infection according to the subjects

Most women believe that toxoplasmosis is a very serious threat to the foetus (82.54%).

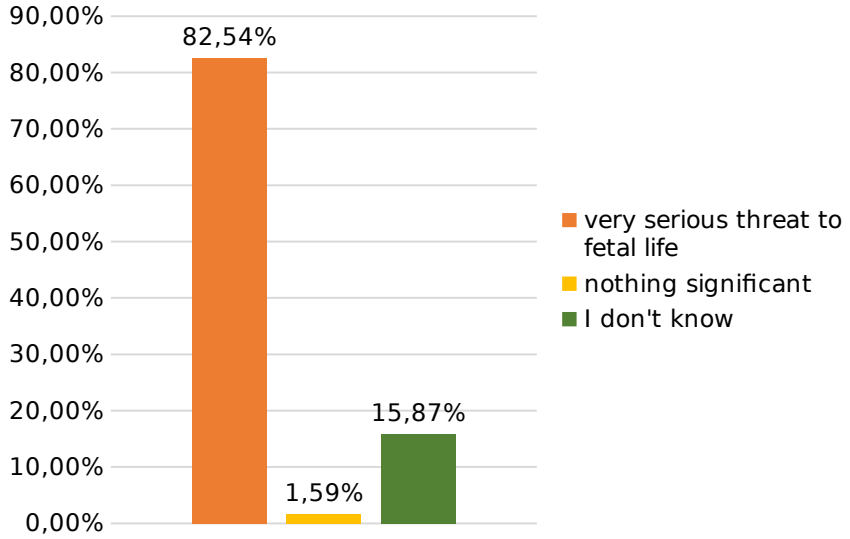

Figure 9. Consequences for the fetus caused by toxoplasmosis according to the subjects

The most frequently mentioned symptom of toxoplasmosis infection was hydrocephalus (82.54%) and microcephalus (53.97%). Rarely mentioned were tuberculosis (9.52%) and jaundice (12.70%).

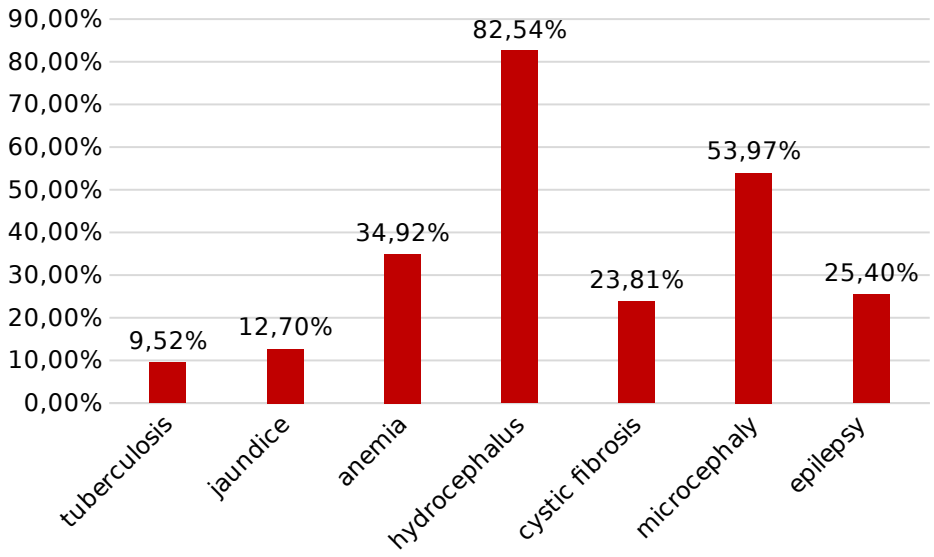

Figure 10. Symptoms of toxoplasmosis that may occur in children according to the subjects

The study also obtained results on what was the main source of knowledge on toxoplasmosis, broken down by level of education. Education has a significant impact on the source from which the respondents drew their knowledge, because p=,002. Most people with vocational education have never heard of such a disease (80%), only one woman gained such knowledge from a doctor. The analysis shows that the most common source of knowledge for people with higher education was a doctor (50%), whereas for those with secondary education - the Internet (53.13%).

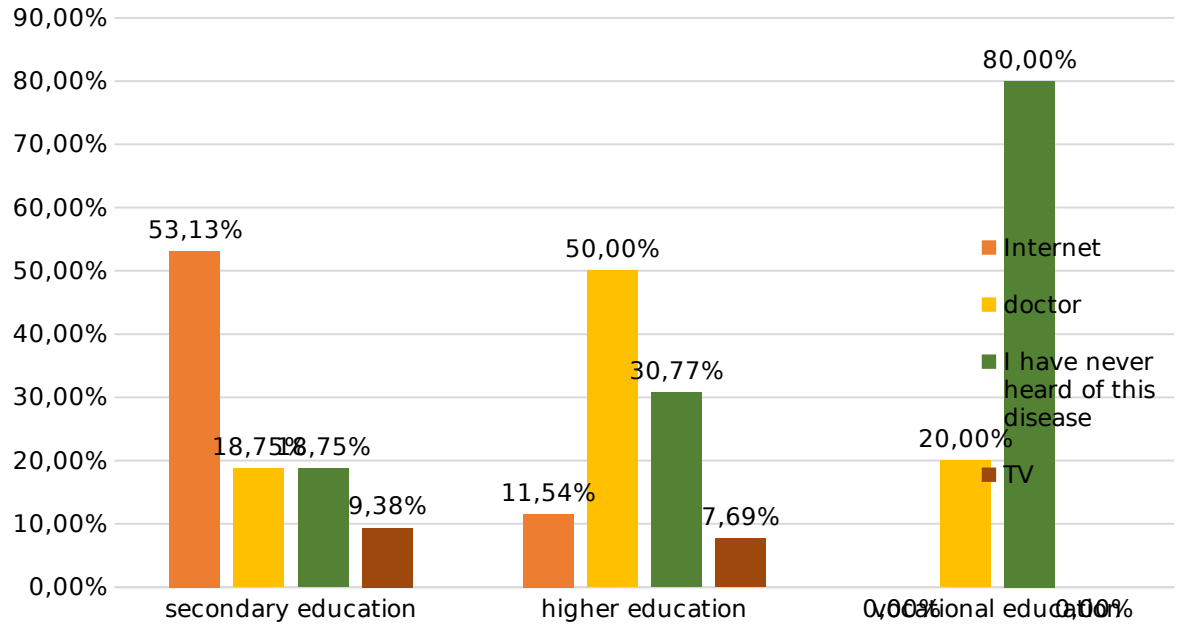

Figure 11. The source of knowledge of the subjects about toxoplasmosis

Discussion

the definition of the disease caused by Toxoplasma gondii are shown by women with higher and secondary education. The most common source of knowledge was the Internet and the doctor. It is disturbing that among the studied population there were people who had never heard of the disease caused by Toxoplasma gondii (28.57%).

The research conducted by Zięba et al. also analyzed the sources of knowledge about the disease among

medical professions and medical students. They most often drew their knowledge from newspapers and books (60%). As far as pregnant women are concerned, about 40% learned about the consequences of the disease from other people[17].

Research has shown that the vast majority of women believe that the disease caused by Toxoplasma gondii can be transmitted through direct contact with the cat (93.65%).

Bench and in studies showed that pregnant women did not know the correct answer to the question about the causes of toxoplasmosis. Most of them thought it was caused by bacteria or virus. It was also observed that the subjects combined the fact of having a cat with the occurrence of the disease[18].

The analysis of the collected material suggests that women indicate the first trimester of pregnancy as the period of the greatest risk of toxoplasmosis infection. According to Bojar, it can most often occur in recent weeks and increases with the duration of pregnancy[19].

The study group was also asked about risky behaviours. Among the most frequently mentioned were food and water consumption, which was contaminated by cats' celebrations (85.71%) or raw meat (55.56%). The respondents also indicated that contamination may occur through eating dirty fruit and vegetables (34.92%).

The Ławik et al. studies show that pregnant women consider cleaning the litter tray (28%) and eating raw meat (19%) to be the most risky behaviour. Among the least numerous answers were gardening work (7%) and drinking unboiled water (3%)[20].

Summary

Toxoplasmosis is a disease that can be prevented by using well-known primary prevention measures. Effective methods for avoiding serious consequences are known. It is therefore important to disseminate this information not only to women for whom the disease may be dangerous because of the developing fetus, but to the whole community. Raising awareness of the preventive actions that are related to the causes and sources of infections can effectively contribute to reducing the incidence and consequences of this disease.

Conclusions

1. The level of knowledge of women about the possibility of toxoplasmosis infection is differentiated.
2. The variables that differentiated the knowledge about toxoplasmosis were age and education.
3. The most often correct answers to the questions were provided by persons with higher and secondary education.
4. Persons with vocational education often could not indicate what is the cause and what disease is caused by protozoa
5. Women, regardless of whether they have children or not, were able to indicate in which trimester of pregnancy it is recommended to have a toxoplasmosis test
6. The most common source of knowledge for people with higher education was a doctor, whereas for those with secondary education - the internet.

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